Echo (near Snoqualmie)

Echo (near Snoqualmie) Overview

Volunteer monitoring began at Echo Lake in 2004. The data indicate that this lake is low in primary productivity (oligotrophic) with very good water quality.

Echo Lake has no public access boat ramp, and residents should keep a watch on aquatic plants growing nearshore to catch early infestations of Eurasian milfoil, Brazilian elodea or other noxious aquatic weeds.

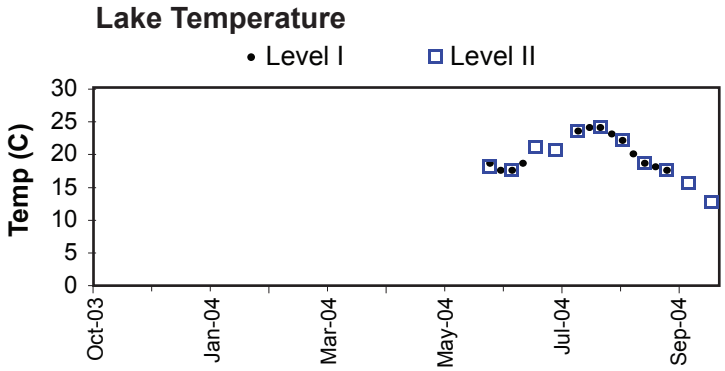
Physical Parameters

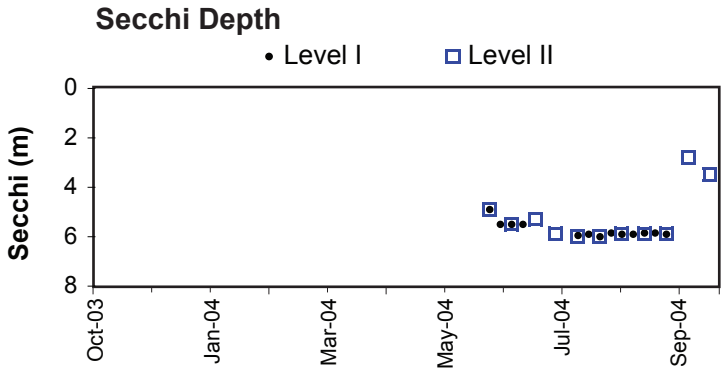
The Secchi transparency during the sampling season ranged between 2.8 and 6.0 m, averaging 5.2 m which was among the upper range of the monitored lakes in 2004. Level II surface water temperatures reached 24.0 degrees Celsius in August, which was in the lower range for recorded maxima for the group.

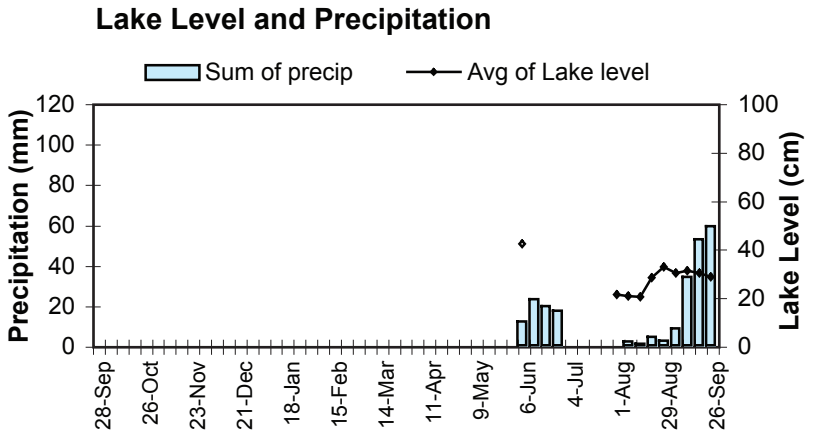
There were no precipitation or water level records for the water year.

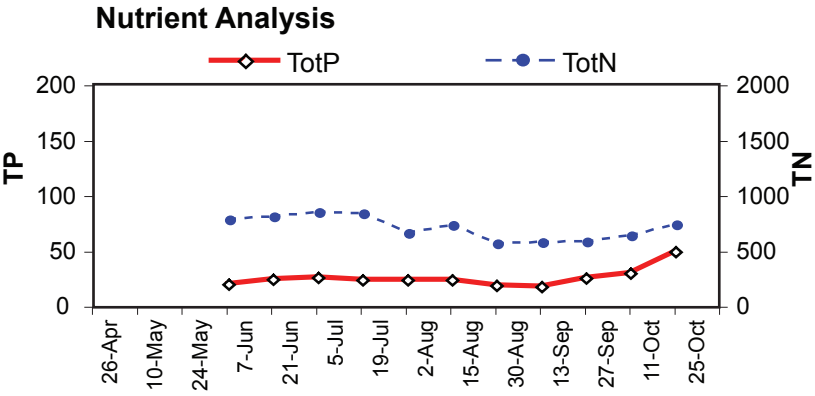
Nutrient Analysis and TSI Ratings

Both total nitrogen and phosphorus remained steady through the season, with phosphorus rising slightly in autumn. The N:P ratio ranged from 15 to 44, averaging 32 over the period. The only value below 20 was on the last sample date, suggesting conditions were generally poor for nuisance bluegreen growth.









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Profile data were only collected in August, when thermal stratification was present, and there was a modest phosphorus increase in the deep water. Chlorophyll data indicated that algae were approximately equal in concentration through the upper water column.

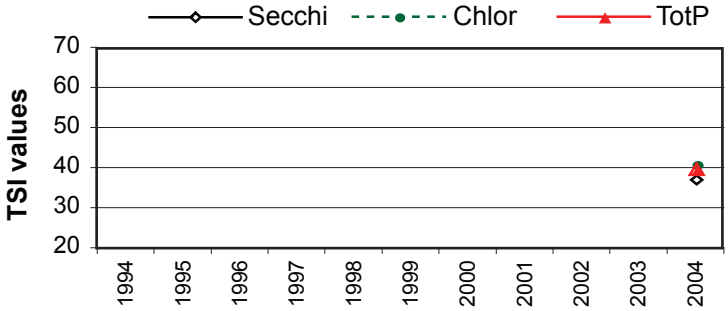
The 2004 TSI values were very close together just below the threshold between oligotrophy and mesotrophy.

Chlorophyll Concentrations and Algae

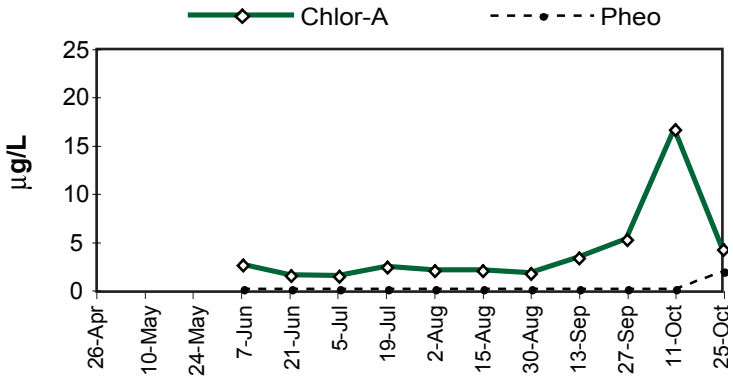
Chlorophyll content at 1m was low through the season, rising to a short-lived peak in early October. Species dominating the phytoplankton community in the spring and summer included the colonial bluegreen *Anacystis*, an unidentified chrysophyte species, and the chrysophyte *Gloeobotrys*. At the chlorophyll peak the most abundant algae were an unidentified chlorophyte colony and the colonial chlorophyte *Sphaerocystis schroeteri*.

Date	Secchi	depth-m	degC	Chlor-A	TP µg/L	TN µg/L
8/30/04	5.9	1	22.0	1.60	8.4	279
		6	20.5	2.40	8.4	322
		12	13.5		37.4	365

TSI Ratings



Chlorophyll a Concentrations (ug/L)



Common Algae

	Group
Unidentified green colony	Chlorophyta
Anacystis sp	Cyanobacteria
Colonial palmelloid colony	Chlorophyta

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2004 Level I Data

Daily Data Summary					Weekly Data Summary						
Week of	Sum of precip. (mm)	# of days	Avg of lake level (cm)	# of days	Sample date	Sample time	Secchi (m)	Temp (°C)	Algae* (Shore)	Algae* (at site)	Goose Count*
28-Sep-03											
5-Oct-03											
12-Oct-03											
19-Oct-03											
26-Oct-03											
2-Nov-03											
9-Nov-03											
16-Nov-03											
23-Nov-03											
30-Nov-03											
7-Dec-03											
14-Dec-03											
21-Dec-03											
28-Dec-03											
4-Jan-04											
11-Jan-04											
18-Jan-04											
25-Jan-04											
1-Feb-04											
8-Feb-04											
15-Feb-04											
22-Feb-04											
29-Feb-04											
7-Mar-04											
14-Mar-04											
21-Mar-04											
28-Mar-04											
4-Apr-04											
11-Apr-04											
18-Apr-04											
25-Apr-04											
2-May-04											
9-May-04											
16-May-04											
23-May-04											
30-May-04											
6-Jun-04	20	1	42	1	7-Jun-04	14:00	4.9	18.5	P2	P1	0
13-Jun-04	38.5	1		1	14-Jun-04	9:00	5.5	17.5	P1	P1	0
20-Jun-04	32.5	1		1	21-Jun-04	14:00	5.5	17.5	P1	P1	0
27-Jun-04	28.5	1		1	28-Jun-04	12:00	5.5	18.5	P2	P1	0
4-Jul-04											
11-Jul-04											
18-Jul-04											
25-Jul-04											
1-Aug-04	0.0	1	21.0	1	2-Aug-04	11:00	6.0	23.5	P1	P1	0
8-Aug-04	3.0	1	20.5	1	9-Aug-04	12:00	5.9	24.0	P2	P1	0
15-Aug-04	1.0	1	20.0	1	16-Aug-04	19:00	6.0	24.0	P2	P1	0
22-Aug-04	7.0	1	28.0	1	23-Aug-04	12:00	5.9	23.0	P2	P1	0
29-Aug-04	4.0	1	32.5	1	30-Aug-04	12:00	5.9	22.0	P2	P1	0
5-Sep-04	14.0	1	30.0	1	6-Sep-04	12:00	5.9	20.0	P1	P2	0
12-Sep-04	57.0	1	31.0	1	13-Sep-04	12:00	5.9	18.5	P1	P2	0
19-Sep-04	88.0	1	30.0	1	20-Sep-04	12:00	5.9	18.0	P2	P2	0
26-Sep-04	99.0	1	28.5	1	27-Sep-04	14:00	5.9	17.5	P2	P2	0
Min	0.0		20.0			**Min**	4.9	17.5			
Max	99.0		42.0			**Max**	6.0	24.0			
Total	392.5										

* See introduction for discussion of algae assessment and goose count methods.

2004 Level II Data

Date (2004)	Temp (°C)	Secchi (m)	Chl-*a* (µg/l)	TP (µg/l)	TN (µg/l)	Algae Obsv.	N:P	Calculated TSI		
								Secc	chl-a	TP
26-Apr										
10-May										
24-May										
7-Jun	18.0	4.9	2.45	8.8	387	1	44	37.1	39.4	35.5
21-Jun	17.5	5.5	1.40	11.3	401	1	35	35.4	33.9	39.1
6-Jul	21.0	5.3	1.30	11.9	422	1	35	35.9	33.1	39.9
19-Jul	20.5	5.9	2.24	11.0	415	1	38	34.4	38.5	38.7
2-Aug	23.5	6.0	1.90	10.9	326	1	30	34.1	36.9	38.6
16-Aug	24.0	6.0	1.90	10.9	362	1	33	34.1	36.9	38.6
30-Aug	22.0	5.9	1.60	8.4	279	2	33	34.4	35.2	34.8
13-Sep	18.5	5.9	3.20	7.7	286	2	37	34.4	42.0	33.6
27-Sep	17.5	5.9	5.13	11.7	288	2	25	34.4	46.6	39.6
11-Oct	15.5	2.8	16.50	14.1	316	2	22	45.1	58.1	42.3
25-Oct	12.5	3.5	4.11	23.7	365	1	15	41.9	44.4	49.8
	Temp (°C)	Secchi (m)	Chl-*a* (µg/l)	TP (µg/l)	TN (µg/l)	Algae	N:P	Calculated TSI		
								Secc	chl-a	TP
Mean	19.1	5.2	3.8	11.9	349.7	1.4	32	36.5	40.4	39.2
Median	18.5	5.9	2.2	11.0	362.0	1	33	34.4	38.5	38.7
Min	12.5	2.8	1.3	7.7	279.0	1	15	34.1	33.1	33.6
Max	24.0	6.0	16.5	23.7	422.0	2	44	45.1	58.1	49.8
Count	11	11	11	11	11	11	11	11	11	11

TSI Average = 38.7